IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:
Yoshio NAKAGAWA et al.:
Serial No. 09/705,838: Group Art Unit: 1771
Filed on November 3, 2000: Examiner: V. S. CHANG

For: ADHESIVE TAPE AND SUBSTRATE FOR ADHESIVE TAPE

DECLARATION UNDER 37 CFR 1.132

Honorable Commissioner of
Patents and Trademarks,
Washington, D.C. 20231

Sir:

I, Yoshio NAKAGAWA, whose full post office address is c/o Nitto Denko Corporation, 1-2, Shimohozumi 1-chome, Ibaraki-shi, Osaka 567-8680 Japan, sincerely declare:

That my education and employment history is as follows:

I was graduated from Department of Applied Chemistry, Faculty of Engineering, Kumamoto Institute of Technology in March 1995, and

In April 1995, I was employed by Nitto Denko Corporation, and I have been engaged in the research and development of adhesive tape products at Tape-Material Business Sector, Substrate R & D Center of Nitto Denko Corporation;

That I am one of the inventors of the above-identified U.S. Patent Application No. 09/705,838 and familiar with the subject matter of this invention;

That I have reviewed the Office Action dated November 7, 2002 issued in the above-identified application and have directly conducted the following experiments to show that the film using Component B of the present invention (a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps) is distinct from a film using Comparative Component B (mechanical blend of polypropylene component and ethylene-propylene rubber component) in the phase separation structure of each

constituent component;

That the following Experiments demonstrate such fact, the results of which follow hereunder;

Experiments

(Object)

A film (Sample 1) made from a mixture of Component A of the present invention and Component B of the present invention (a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps), and a film (Sample 2) made from a mixture of Component A of the present invention and Comparative Component B (mechanical blend of polypropylene component and ethylene-propylene rubber component) were prepared, and the sections of these Samples 1 and 2 were observed with a transmission electron microscope (TEM), after which the phase separation structures of respective constituent components were compared.

(Sample preparation method)

(Sample 1)

Component A: ethylene-vinyl acetate copolymer (EVA), trademark: EVAFLEX P-1905 60 parts by weight

Component B: propylene/ethylene copolymer wherein polypropylene (PP) component was polymerized in the first step and ethylene-propylene rubber (EPR) component was polymerized in the second step, trademark: CATALLOY KS-353P, PP/EPR=30/70 (weight ratio) 40 parts by weight

The above-mentioned Component A and Component B were dry blended and kneaded in Labo Plastomill. Then, the kneaded blend (composition ratio: PP/EPR/EVA=12/28/60 (weight ratio)) was formed into a 3 mm-thick film by a press machine heated to 170°C.

(Sample 2)

Component A: same as in Sample 1 60 parts by weight

Comparative Component B: a physical mixture (mechanical blend) of polypropylene (PP, trademark: NOVATECH FX3, 12 parts by weight) and ethylene-propylene rubber (EPR, trademark: SPO VO-141, 28 parts by weight)

The above-mentioned Component A and Comparative Component B were dry blended and kneaded in Labo Plastomill. Then, the kneaded blend (composition ratio: PP/EPR/EVA=12/28/60 (weight ratio)) was formed into a 3 mm-thick film by a press machine heated to 170°C.

(Transmission electron microscopic observation)

To clarify the phase separation structure of the inside of the Samples 1 and 2 obtained as mentioned above, the Samples were subjected to dye treatment with ruthenate (2% aqueous solution), and 2 hours later, embedded in epoxy resin, and the sample section was observed by ultramicrotomy using TEM (Hitachi H-800, acceleration voltage: 100kV) and TEM photographed.

(Results)

The obtained TEM photograph is shown below. Ruthenate stains ethylene component more deeply. As a result, it was confirmed that every sample showed a phase separation structure (matrix-domain structure), as evidenced by the intensity of ruthenate staining.

In other words, while Sample 1 and Sample 2 both contained a matrix portion, which was an EVA (Component A)-rich phase, the domains dispersed in the matrices were different.

To be specific, in Sample 1, amorphous domains having a size of micron order were dispersed in the matrix, which was considered to be a Component B (of the present invention)-rich phase.

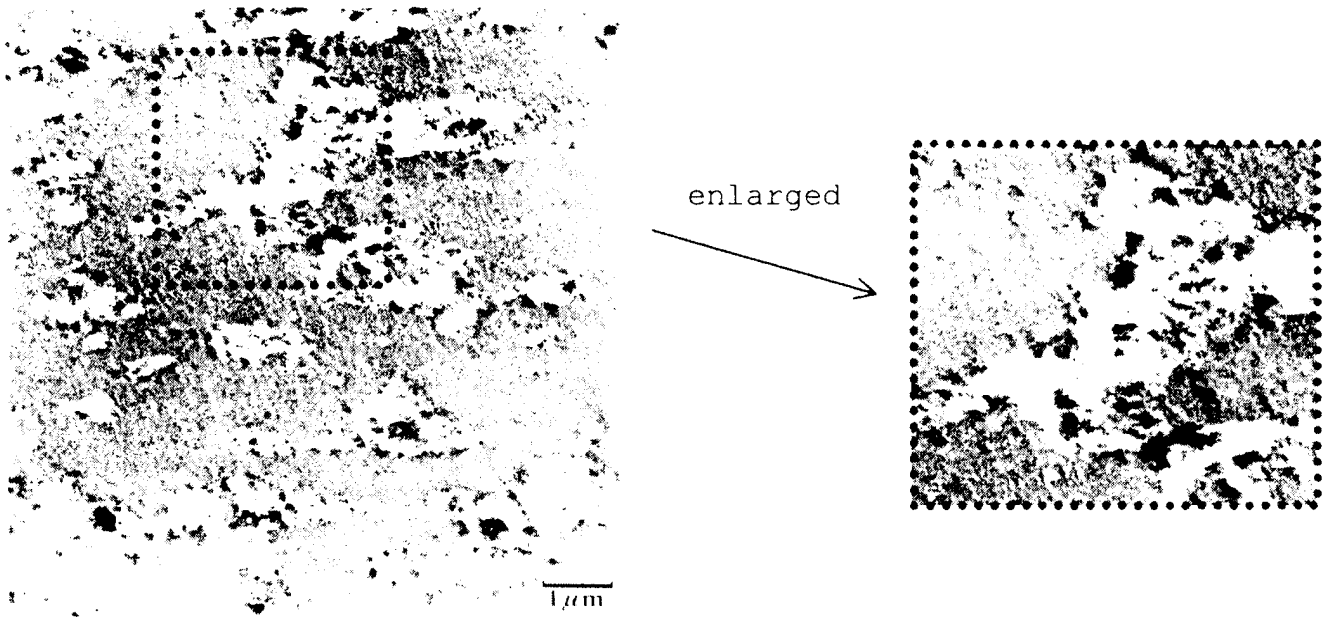
The phase separation structure as evidenced by the

intensity of the ruthenate staining was confirmed in the inside of this domain. The part (black) deeply stained with ruthenate in the inside of this domain was evaluated to be an EPR-rich phase, and the part stained lightly (white - gray) was evaluated to be a PP-rich phase.

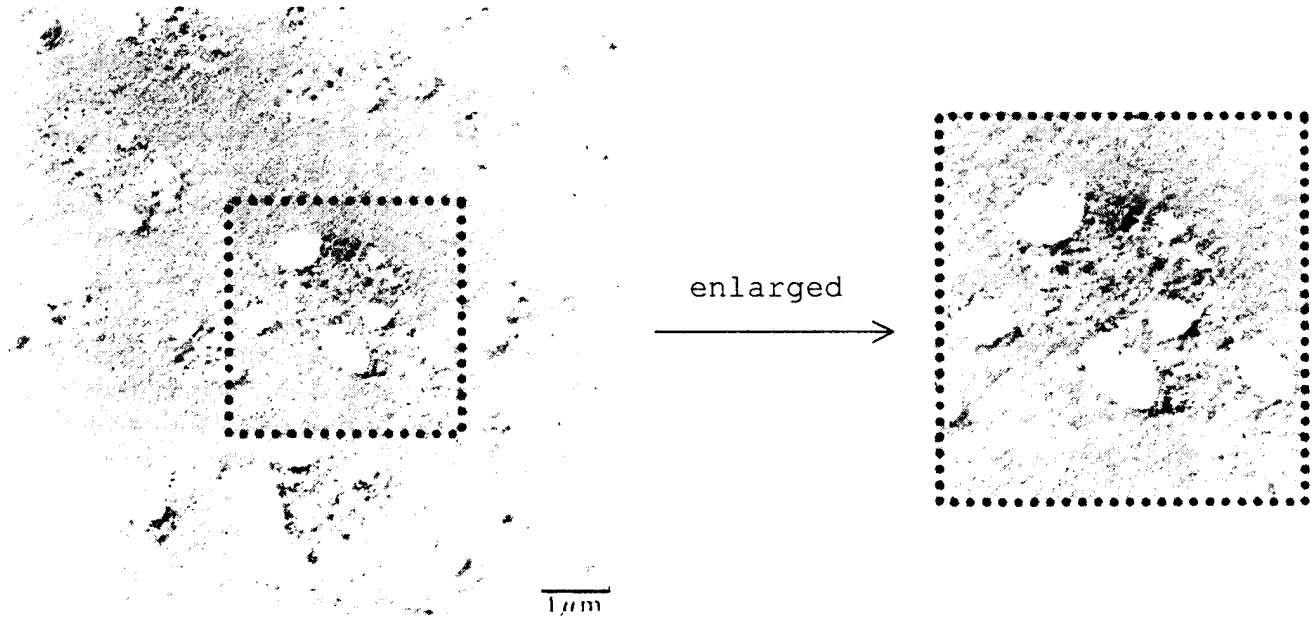
In contrast, an about 1 μm round domain (domain a) was observed in Sample 2, and around this domain, a domain (size of micron order; domain b) stained slightly deeper with ruthenate than the matrix part was confirmed. In view of the constituent components of the sample, the domain a stained lightly (white - gray) with ruthenate, from among these domains, was evaluated to be a PP (of Comparative Component B)-rich phase, and the domain b stained deeper was evaluated to be an EPR (of Comparative Component B)-rich phase.

TEM Photograph

Sample 1 (Component A of the present invention
+ Component B of the present invention)



Sample 2 (Component A of the present invention
+ Comparative Component B)



(Conclusion)

From the above TEM photograph, it is clear that Sample 1 using Component B of the present invention (a propylene/ethylene copolymer obtained by multi-step polymerization involving two or more steps) and Sample 2 using Comparative Component B (mechanical blend of polypropylene component and ethylene-propylene rubber component) are different in the phase separation structure of each constituent component (PP/EPR/EVA).

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Osaka, Japan on this 28th day of February, 2003

Yoshio Nakagawa

Yoshio NAKAGAWA